

REMARKS

Status of claims

Applicants thank the Examiner for the consideration given to the present application. Claim(s) 1-3, 6-9, 12, and 13 are amended. Support for the amendment is found in the specification and drawings. Particularly, claims 1, 7, and 13 are amended such that the filter material is formed in part from a plurality of filter particles "consisting of mesoporous activated carbon." Support for the amendment that the filter particles consist of mesoporous activated carbon is found, for example, on page 11, paragraphs [0127] - [0128] (Example 3). Example 3 of the present application clearly shows mesoporous activated carbon powder (Nuchar RGC) being used to form the filter particles (and not to form a coating on a filter particle), then mixed with a binder, placed in a mold with certain dimensions, heated, and cooled to form a filter material. Thus, Applicants submit that Example 3 provides ample support for the amendment the filter particle "consisting of mesoporous activated carbon." (See also, page 2, paragraph [0027]; page 3, paragraph [0056].)

Claims 4 and 10 were previously canceled without prejudice. Claims 1-3, 5-9, and 11-18 are pending in the present application.

Objection to the Claims under 37 CFR 1.75(c)

Claim 8 is objected under 37 CFR 1.75(c) as being of improper dependent form for failing to further limit the subject matter of a previous claim. Accordingly, claim 8 has been amended to correct the objection. Thus, Applicants respectfully request the objection to this claim be withdrawn.

Rejection of the Claims under 35 U.S.C. §103

Claims 1-3, 5-6 and 16 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Koslow (US Patent No. 6,630,016) in view of admitted prior art by applicant and Jagtoyen et al (US. Pub. No. US 2004/0040906). Claims 7-9, 11-12 and 17 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Koslow in view of admitted prior art by applicant. Claims 13 and 18 have been rejected under 35 U.S.C. 103(a) as being anticipated by Koslow in view of admitted prior art by applicant. Claims 14-15 have been rejected under 35 U.S.C. 103(a)

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as being unpatentable over Koslow in view of admitted prior art by applicant as applied to claims 7 and 13 above, and further in view of Jagtoyen et al. Claims 1-3 and 16 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Mitchell et al (US Patent No. 6,827,854) in view of Koslow and Jagtoyen et al. Claims 7-9 and 17 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Mitchell et al in view of Koslow. Claims 13 and 18 have been rejected under 35 U.S.C. 103(a) as being anticipated by Mitchell et al in view of Koslow. Claims 14-15 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Mitchell et al in view of Koslow as applied to claims 7 and 13 respectively above, and further in view of Jagtoyen et al.

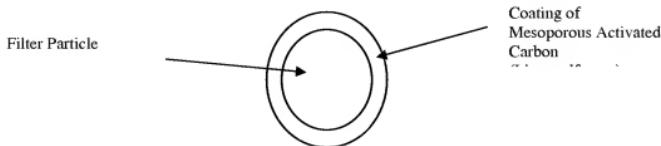
Applicants respectfully traverse these rejections. In order to establish a prima facie case of obviousness under §103, the Examiner has the burden of showing, by reasoning or evidence, that: 1) there is **some suggestion or motivation**, either in the references themselves or in the knowledge available in the art, **to modify** that reference's teachings; 2) there is a reasonable expectation on the part of one of ordinary skill in the art that the modification or combination has a reasonable expectation of success; and 3) the prior art references (or references when combined) **teach or suggest all** the claim **limitations**. (Emphasis added, MPEP §2145).

1. Examiner Interview

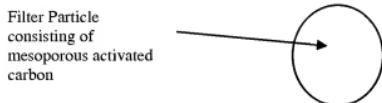
The Applicants would like to thank the Examiner for the Examiner Interview held with the Applicants on May 15, 2007. The Applicants distinguished applied reference Mitchell from the present invention by pointing out the Mitchell teaches a filter material comprising a filter particle (e.g., a glass particle) and a lignosulfonate that is coated over the filter particle as shown below. Mitchell discloses carbonizing and activating the lignosulfonate coating to form a mesoporous activated lignosulfonate coating over the core filter particle. Mitchell is silent regarding the actual filter particle being mesoporous activated carbon. Mitchell only teaches the coating being mesoporous activated carbon. For example, Mitchell discloses, "The sum of mesopore and macropore volumes of filter particles coated with an activated lignosulfonate is between 0.2 mL/g (g refers to the **mass of the carbon in the activated coating**) and about 2.2 mL/g." (Col. 8, lines 32-35). Thus, the intra-particle pore volumes taught in Mitchell are only for the carbon in the coating, and clearly do not teach or suggest intra-particle pore volume of a

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filter particle comprised entirely of mesoporous activated carbon as recited in the claims of the present invention.



In sharp contrast, the present invention claims a filter comprising a filter material formed in part from a filter particle consisting of mesoporous activated carbon as shown below, wherein the filter has a F-BLR of greater than about 2 logs and F-VLR of greater than about 1 log. Mitchell's filter particles coated with a mesoporous lignosulfonate are clearly different structures from the filter particles consisting of mesoporous activated carbon. As set forth and shown above, Mitchell does not show, suggest, or motivate a filter material formed in part from a filter particle consisting of mesoporous activated carbon, only a mesoporous lignosulfonate coating that is applied over the filter particle. Moreover, Applicants submit that neither Mitchell nor any of the other applied references, singularly or in combination, teach or suggest a filter comprising a filter material formed in part from a plurality of filter particles consisting of mesoporous activated carbon, wherein the filter has a F-BLR of greater than about 2 logs and F-VLR of greater than about 1 log.



The Examiner agreed with the Applicants that the applied references do not teach the invention as claimed, and thus, the claims set forth above are allowable.

2. Additional Remarks

Applicants' independent claims 1, 7, and 13 all recite, inter alia, a filter comprising a filter material formed at least in part from a plurality of **filter particles consisting of mesoporous**

activated carbon, wherein the **filter** has a **F-BLR** of greater than about **2 logs** and a **F-VLR** of greater than about **1 log**.

Applicants submit that Koslow does not teach a filter comprising a filter material formed in part from filter particles consisting of mesoporous activated carbon, wherein the filter has a F-BLR of greater than 2 logs and a F-VLR of greater 1 log as recited in Applicants independent claims 1, 7, and 13. Applicants submit that Koslow does generally teach activated carbon block filters made with activated carbon particles and a binder. However, Applicants submit that Koslow fails to teach Applicants' claimed filter having its unique and unobvious combination.

First, Koslow teaches a filter comprising an activated carbon filter structure which has a microporous **inter-particle** pore volume (Col. 2, lines 1-14, (active carbon particles having an average particle size of about 0.1 microns to about 5,000 microns and forming the treated active particles into a **microporous** structure having a mean flow path of less than about 2 microns). In contrast, independent claims 1, 7, and 13 recite a filter comprising a filter material formed in part from a plurality of filter particles consisting of mesoporous activated carbon (**intra-particle** pore volume). No where does Koslow teach, suggest, or motivate mesoporous (intra-particle pore volume as defined in the specification) activated carbon filter particles, let alone a filter material formed from filter particles consisting of mesoporous activated carbon, wherein the filter has the recited F-BLR and F-VLR values as recited in claims 1, 7, and 13.

Second, Koslow teaches that the activated carbon filter particles include and require a **microbiological interception enhancing agent** coating in order for the filter to achieve the bacteria and virus removal levels taught. Koslow teaches the microbiological interception enhancing agent comprises and requires both a **cationic material** that is first coated onto the activated carbon particles and then a **biologically active metal** (e.g., silver) which is precipitated onto the cationic material in order to achieve its efficacy as a filter (col. 1, lines 52-60). In sharp contrast, Applicants' invention **does not require** the **intermediate cationic polymer** in order to coat the **silver onto** the activated carbon **filter particles** and to achieve its F-BLR and F-VLR values. Rather, the present invention enables **skipping the intermediary step of coating the activated carbon with a cationic polymer**, thus saving processing time and material costs, required and taught in Koslow. In other words, Applicants' claimed filter requires no such additional cationic polymer aid to coat the silver onto the filter particle as taught by Koslow to

achieve its F-BLR and F-VLR values. Therefore, Applicants respectfully submit that Koslow does not teach or suggest, explicitly or inherently, singularly or in combination with Mitchell, a filter formed from a plurality of filter particles consisting of mesoporous activated carbon as recited in Applicants' independent claims 1, 7, and 13, let alone a filter formed from filter particles consisting of mesoporous activated carbon and having a **F-BLR** of greater than about 2 logs and a **F-VLR** of greater than about 1 log as recited by Applicants' independent claims 1 and 30.

The Examiner further asserted that the Applicants describe known mesoporous and basic activated carbon powder known as Nuchar RGC in a Teflon housing, wherein the RGC has properties of F-BLR of about 6.8 logs and F-VLR of greater than about 4.2 logs. However, the Applicants submit that the Examiner has misunderstood the teachings of Example 3 of the present invention and thus has improperly used the Applicants' own specification against them. Example 3 of the present application describes an exemplary embodiment of the present invention. Applicants submit that the Nuchar RGC mesoporous and basic wood-based activated carbon powder disclosed in Applicants' Example 3 is a commercially available mesoporous activated carbon powder. However, Applicants further submit that the commercially available Nuchar RGC is only a loose powder, and contrary to the Examiner's assertion, the Nuchar RGC powder did not include a Teflon housing. Moreover, the Nuchar RGC had not been transformed into a filter, let alone the filter of the present invention having one or more of the filter characteristics of the present invention such as face area, filter pore volume, binder mix, dwell time, etc., that in combination with the mesoporous activated carbon provide the filter the claimed F-BLR and F-VLR values. The Federal Circuit has held that most, if not all, inventions arise from a combination of old elements and thus every element of a claimed invention may often be found in the prior art. *In re Kotzab*, 217 F.3d 1365 (Fed. Cir. 2000).

Specifically, the exemplary embodiment of the present invention shown in Example 3 discloses taking about 18.3 g of the commercially available Nuchar.RGC powder and forming it into the filter of the present invention. Example 3 discloses, in part, the following steps were performed in order to transform the commercially available Nuchar RGC powder into the exemplary filter of the present invention. First, Example 3 discloses mixing the Nuchar RGC with about 7 g of low-density polyethylene (LDPE) binder. The mixed powders are then poured

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into a circular aluminum mold with about 3 in. (about 7.62 cm) internal diameter and about 0.5 in. (about 1.27 cm) depth. The mold is closed and placed in a heated press with platens kept at about 204.^oC. for 1 h. Then, the mold is allowed to cool to room temperature, opened, and the axial flow filter is removed.

Example 3 then discloses that the exemplary filter of the present invention has the following filter characteristics: face area: about 45.6 cm^{sup.2}; filter depth: about 1.27 cm; filter total volume: about 58 mL; filter porosity (for pores greater than about 0.1 .mu.m): about 0.43; and filter material pore volume (for pores greater than about 0.1 .mu.m): about 25 mL (as measured by mercury porosimetry). The filter of the present invention is placed in the Teflon.RTM. housing. When the flow rate is about 200 mL/min, the pressure drop of this filter is about 17 psi (about 1.2 bar, 0.12 MPa) for about the first 2,000 filter pore volumes.

Applicants respectfully submit that the present invention combines one or more of the exemplary filter characteristics set forth above with the mesoporous activated carbon filter particles to obtain a filter that is operable to remove bacteria and viruses at the recited F-BLR and F-VLR values. Example 3 does not teach that the Nuchar RGC powders by themselves have a F-BLR of greater than 2 logs and a F-VLR of greater 1 log. Example 3 teaches that only after forming the filter by combining one or more of the filter characteristics above with the mesoporous activated carbon filter particles does the filter have the recited F-BLR and F-VLR values. Applicants respectfully submit that no where does the Nuchar RGC powder teach, suggest, or motivate forming a filter comprising the unique and unobvious combination of filter particles consisting of mesoporous activated carbon and one or more of the exemplary filter characteristics set forth above to obtain a filter having a F-BLR of greater than about 2 logs and F-VLR of greater than about 1 log as recited in claims 1, 7, and 13.

Thus, Applicants further submit that neither Mitchell, Koslow, nor the Nuchar RGC powder, singularly or in combination, teach or suggest, a filter comprising a filter material consisting of mesoporous activated carbon, wherein the filter has a F-BLR of greater than about 2 logs and a F-VLR of greater than about 1 log as recited in Applicants' independent claims 1, 7, and 13. Accordingly, Applicants respectfully request the rejections of claims 1, 7, and 13 under 35 U.S.C. 103 be withdrawn. As claims, 2-3, 6, 8-9, 11-12, and 14-18 depend from independent

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claims 1, 7, or 13, Applicants respectfully request the rejections of these claims under 35 U.S.C. 103 be withdrawn as well.

CONCLUSION

Applicants respectfully submit that the present application is in condition for allowance. The Examiner is encouraged to contact the undersigned to resolve efficiently any formal matters or to discuss any aspects of the application or of this response. Otherwise, early notification of allowable subject matter is respectfully solicited.

Respectfully submitted,
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